NARRATIVE REPORT

MALHEUR NATIONAL WILDLIFE REFUGE

REGION I

1972

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
Malheur National Wildlife Refuge
P. O. Box 113
Burns, Oregon 97720

Malheur National Wildlife Refuge
Burns, Oregon

Narrative Report for Period January 1 to December 31, 1972

Roster of Permanent Personnel

Joseph P. Mazzoni	Refuge Manager
Walter L. Anderson (LWOP 6/4/72)	Wildlife Biologist (Management)
Noel L. Cagle	Maintenanceman Foreman
Ivan J. Carey	Management Assistant
Robert A. Carlson	Maintenanceman
Quentin L. Currey	Maintenanceman
Jack A. Dalton (Retired 10/20/72)	Maintenanceman
Hector J. DeRoest (Retired 6/30/72)	Building Repairman
Sean B. Furniss (Resigned 9/9/72)	Refuge Manager
Irma G. Gail	Clerk-Stenographer
Kenneth W. Hite	Maintenanceman
Marvin L. Jess	Dragline Operator
Eldon L. McLaury	Wildlife Biologist (Management)
Elmer D. Reynolds	Engineering Equipment Mechanic
Richard E. Toltzmann (Transferred 9/30/72)	Refuge Manager
Norman J. Warneke (E.O.D. 10/15/72)	Maintenanceman

Roster of Temporary Personnel

James B. Doherty (9/12/72 to 11/11/72)	Maintenanceman
Frederick R. Fivecoat (E.O.D. 10/10/72)	Maintenanceman
Christine M. Gniewosz (8/26/72 to 9/16/72)	Biological Aid
Thurman L. Kennedy (7/31/72 to 8/19/72)	Summer Aid
Leslie L. Lafferty (7/19/72 to 8/19/72)	Summer Aid
Guy W. Leslie (E.O.D. 11/13/72)	Maintenanceman
Richard R. Sjostrom (E.O.D. 8/18/72)	Biological Technician (Wildlife)
Tye O. West (7/18/72 to 8/30/72)	Summer Aid

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I. GENERAL

A. Weather Conditions

Total precipitation was near normal for the year, with 8.54 inches at headquarters, 11.28 inches at the P-Ranch, and 7.70 inches at the Double-O. This compared to the 35-year average of 9.12, 10.86 and 8.61 inches respectively. Unfortunately, rainfall was not well distributed, and unseasonably cold, windy weather prevailed during much of the early growing season. Coupled with a lack of June rains, vegetative growth in the rangeland areas adjacent to the refuge was generally quite poor. Lands subject to flood irrigation benefited from the excellent snowpack and run-off conditions, and produced normal, and in some cases, above normal vegetative growth, particularly in the Upper Blitzen Valley. Many meadows in the Double-O Unit did not produce well, as a result of the poor growing weather combined with the early run-off received there from Silver Creek.

The dearth of rains and warm weather during the summer months contributed to a rather rapid evaporation rate in the lakes, marshes and ponds, and areas like Harney and Stinking Lakes were extremely low by late summer.

The advent of Fall rains and cooler weather contributed to a good carryover of water in Malheur Lake.

B. Habitat Conditions

1. Water

At the beginning of the year, excellent water supplies were projected for the Harney Basin during the 1972 season. The early season snowpack was much above average, especially at the lower elevations. Precipitation during December, 1971 was about 135 percent of average, and for the period October-December, 1971, 113 percent of average. As spring approached, refuge watershed snowpacks averaged 150 percent of normal and soil moisture supplies were near average. The Blitzen was forecasted to flow 74 thousand acre feet, or 148 percent of average; the Silvies 105 thousand acre feet, or 130 percent of average; and Silver Creek 17 thousand acre feet, or 95 percent of average.

Despite much below average rainfall and the prolonged period of cool temperatures during the late spring and early summer

months, above normal runoff was experienced in all three watersheds. Ample water was available for use in the Blitzen Valley Unit, and both the Blitzen and Silvies Rivers made substantial contributions to Malheur Lake. The lake increased from a low of about 50,000 surface acres of water in December, 1971, to a peak 1972 level of 60,000 to 63,000 surface acres on April 20. It then gradually receded to about 48,000 surface acres in early August. December runoff brought the lake up to about 50,000 surface acres, where it remained at the end of the year.

The excellent flows received from Silver Creek were unfortunately of short duration, and the north portion of the Double-O Unit dried up rather quickly. The manner in which the runoff occurred was part of the problem, bur management of Moon Reservoir may have had an important bearing on the rapidity at which the flow stopped. The use of this privately managed reservoir, and its impact on refuge water rights, will have to be more closely monitored in the future.

Silver Creek and, especially Malheur Lake contributed heavily to Harney Lake, and Harney filled nearly to capacity by early summer. Once the Silver Creek runoff stopped, and the Dunn family began irrigating their private lands in Mud Lake with the overflow water from Malheur Lake, Harney receded quickly to 10-15,000 surface acres, or roughly a third of its former size.

Basin water users will have average to below average water supplies during the spring and summer of 1973 if conditions present at the end of the year continue. The early season snow pack is average to much below average, ranging from 30 percent on the Blitzen River drainage to 95 percent on the Silvies River. Rainfall was 110 percent for the November-December, 1972 period. Soil moisture is average for this time of year. The outlook for runoff to the refuge is not good for 1973.

Of special interest during the year was the implementation of a water measuring program for the entire refuge. With the assistance of Division of Engineering personnel, all contributing water sources, and water diversion points within the refuge, were regularly measured during the course of the year. This is to be an integral part of our annual water management program, and will allow us to (1) document our use of water

for the protection of refuge water rights; (2) development of information useful to determining how future allocations of water on the refuge should be made (particularly in short water years); (2) monitor management of Moon Reservoir; (4) provide a basis for developing a water management plan for Krumbo Reservoir; and (5) develop information needed to do a proper job of managing our various ponds. We also established initial management levels for all ponds subject to manipulation, and began installing the necessary staff gauges.

2. Food and Cover

Winter - Following a frigid December and late January, temperatures abated and the rest of the winter period was relatively mild. Upland game fared well under the circumstances, feeding on residual food supplies of grain and weed seeds, and roosting in the numerous marshes and tule patches. Deer and antelope remaining on the refuge also wintered well on available native food supplies. Heavily grazed crested wheat grass seedings adjacent to the refuge again provided ample goose browse to Canada geese wintering on the area. Malheur Lake became ice free March 15, exposing residual aquatic food supplies to spring migrant waterfowl and shorebirds. Early spring flooded meadows and remnants of last year's grain crop provided the balance of food supplies to wildlife species.

Spring - Malheur Lake surface acreage continued to expand as runoff waters from the Blue and Steens Mountains flowed into the lake basin. Raising water levels reflooded dry portions of the lake basin to provide food and water habitat for spring migrants, and set the stage for an excellent waterfowl and waterbird production season.

Summer - Ample runoff waters were used to flood a near maximum acreage of breeding bird habitat in the Blitzen Valley and Double-O units, as well as in Malheur Lake. Fair residual cover adjacent to water areas was available for early nesting waterfowl and waterbirds. A luxuriant stand of current vegetative growth provided excellent cover for late nesting species. Malheur Lake receded to approximately 48,000 surface acres (about 24,000 acres of open water, and 24,000 acres of marsh) by August 1, with an estimated 6,000 acres of sago pondweed in open water areas. This acreage compares with about 15,600 acres in 1971, and 10,000 acres in 1970.

The following table presents areas and acres of better sago production in Malheur Lake for the past three years.

Area	Estimated Acres 1970	1971	1972
Saddle Butte Bay	2,100	2,500	0
North Side Malheur Lake	1,800	2,000	0
East of Cole Island Dike	1,900	4,000	5,400
N and E Benson Boat Landing	2,700	2,900	0
Center of Lake (See 1970 NR)	1,100	1,100	T
W of Bat House Point	400	1,800	600
E of Bat House Point		500	T
Mud Lake		800	T
	10,000	15,600	6,000

The thriving carp population provided food for all fish eating species but muddied waters and reduced the acreage of sago pondweed raised this year.

Blitzen Valley ponds produced fair to good stands of sago pondweed that received extensive use by locally produced and migrant waterfowl. However, there is still a shortage of duck brooding areas in the Blitzen Valley and Double-O, Buena Vista Pond, Boca Lake, and Malheur Lake along with refuge grain fields were favored watering and feeding areas for the greater sandhill crane population nesting and staging on the refuge.

Food, water, and cover on uplands and in the foothills above the refuge were in good supply again this summer. Accordingly, deer and antelope were not forced onto the refuge for such necessities as they were in 1968.

Fall - Malheur Lake receded to approximately 40,000 surface acres by October 1, drying the open water areas east of the Pelican Islands and many other areas that contained a fair stand of sago pondweed. Subsequently, only limited aquatic food supplies were available for migrating waterfowl. However, exposed mud flats from receding lake waters did provide excellent habitat for migrating shorebirds. Grain fields at Knox Pond and Buena Vista were major attractions to waterfowl and sandhill cranes, but were 90 percent or more utilized by November 15. Boca Lake with 450 surface acres of water flooding the extensive smartweed stand was one of the more attractive areas to birds in the Blitzen Valley. Up to 10,000 ducks,

2,500 Canada geese, 800 cranes, and numerous shorebirds and grebes used the area this fall. Flooded meadows in the Double-O provided excellent feeding and water areas for migrant shorebirds, ducks, and geese.

Winter - Sub-zero temperatures in December took a heavy toll of upland game, in spite of excellent cover in marshes and tule patches. With grain fields fed out, and open water virtually non-existent, a majority of the waterfowl departed for southern climes. Deer moved into the headquarters area and thrived well on the shrubbery.

II. WILDLIFE

A. Migratory Birds

1. Waterfowl

a. Trumpeter Swans - From a wintering population of 45 trumpeters, there were 3 known mortalities (shot at Grain Camp Dam April 13, 1972) and probably several others, reducing the population estimate to 40 at the beginning of the breeding season. Seven pairs set up nesting territories with five pairs successful in raising 13 cygnets as of August 31. Nesting areas and cygnets raised to flight are shown below.

Malheur Lake	2	Benson Pond	0
MacLaughlin Slough	3	Jones Field	3
Unit 9 Pond	3	Knox Pond	2
Knox Swamp	0		

Near the close of the period (December 16), sub-zero temperatures moved the entire refuge trumpeter swan population onto the refuge Display Pond. We counted 35 adults, and 10 cygnets in 5 families of 2, 2, 2, 3, and 1 for a known population of 45, the same as a year ago.

b. Whistling Swans - arrived February 13, compared to January 26, 1971, and peaked at 5,000 birds March 3-11 compared to a peak of 11,100 March 21-27 a year ago. The fall population peaked at 15,500 November 5-11, a week earlier and 4,200 birds less than in 1971. Unfortunately, we have not received our computer printouts of waterfowl use days for the year, and we cannot make a comparison to 1971 -- but, perhaps next year.

c. Geese - Arrival and departure dates, peak populations, and goose use in 1972 varied little from previous trend data. Canada goose production of 1,630 compares with 2,400 a year ago. There were three recorded observations of one or two blue geese in flocks of 300 to 3,000 snow geese during the spring migration period.

d. Ducks - Pair counts over air and ground transects were completed during the period May 19 - 31. Methods generally compared with those used since 1966.

Duck breeding pairs reversed their upward trend, with an estimated 16,500 pairs this year, compared to 20,700 pairs a year ago, and 16,700 pairs in 1970. Mallard, gadwall, cinnamon/blue-winged teal, and redhead pairs comprised nearly 79 percent of the duck breeding population. Production was estimated at 33,700 ducklings, based on 1970 calculated nesting success (a comparable water year), and the refuge 8-year average brood size. Our 1972 production compares with 44,900 a year ago. Fewer duck pairs is the principal reason for lower production in 1972 compared to 1971.

Migration - Spring duck populations peaked at comparable periods, but with lower totals than recorded in 1971. The spring peak of 116,500 compares with 155,600 last year. Fewer pintails accounted for the principal difference.

The fall peak population of 145,100 was recorded August 6-11, compared to 158,800 October 17 - 23, 1971. Pintails comprised a majority of the early duck peak this year, while canvasbacks, baldpate, gadwall, and pintails made up the bulk of the peak population in 1971. Fall canvasback use and peak numbers were less than half that recorded a year ago, explicitly depicting the lack of sago pondweed production in the lake.

e. Coots - Spring coot use was up (peak of 86,000) and fall use (peak of 52,000) was down compared to 1971. Production was estimated at 39,600 this year, compared to 41,300 a year ago.

2. Water and Marsh Birds

Annual flock composition counts in September tallied 43 young of the year compared to 46 a year ago.

There were nine colonies of wading birds and gulls on Malheur Lake this year, the same number and in generally the same locations as a year ago. However, there was a general increase in the number of nests over last year, principally the result of an increase in nesting pairs (a suspected reaction to the increased carp population in the lake), although some renesting or second nesting attempts did occur. The following table presents colonial bird nest estimates on the lake for the past three years.

Colonial Nesting Species
Malheur Lake

Species	Nest Estimates* 1970	1971	1972
Double-crested Cormorant	50	45	70
Great Blue Heron	100	110	150
Common Egret	180	150	285
Snowy Egret	55	35	80
Black-crowned Night Heron	500	750	750
White-faced Ibis	25	20	25
Franklin's Gull	325	400	500

*Includes nests not in colonies

Comparative data on eggs per nest for some of the colonial nesting species is presented in the table below. All data are based on initial nesting attempts.

Colonial Nesting Species
Malheur Lake

	1970	1971	1972
Double-crested Cormorant	3.2 (51 Nests)	3.38 (43 Nests)	3.25 (59 Nests)
Great Blue Heron	3.3 (85 Nests)	3.02 (79 Nests)	3.61 (79 Nests)
Common Egret	3.5 (39 Nests)	3.44 (48 Nests)	4.13 (131 Nests)
Snowy Egret	3.2 (17 Nests)	4.05 (19 Nests)	4.15 (52 Nests)

White-faced ibis were commonly observed feeding on mud flats at the Narrows and in the Wright Field in August and September. Flocks of 30 - 35 usually seldom observed were commonly observed this year.

Eared and western grebes numbers were similar to last year, with an estimated 800 eared grebe nests and 475 western grebe nests on the refuge (see biological files for further information and colony location).

3. Shorebirds, Gulls, and Terns

Population estimates, use, and production are shown in respective NR reports in the Biological Files.

Of special interest was the location of a single California gull nest on a muskrat house in the center section of Malheur Lake. This is the first known nest of this species on Malheur Lake since 1965.

Franklin's gull nest numbers continue their upward trend, (see previous table), a welcome increase by an interesting species.

4. Doves

We observed no apparent change in arrival and departure dates, population, or nesting densities, although very little work has been done with the species at Malheur.

B. Upland Game Birds

Population samples, census route data and hunter success indicate upland game species of pheasant, valley quail, and chukar had a poor year. Breeding pair numbers were down, production was poor, and a severe cold snap with temperatures dropping to 30° below zero in December have resulted in one of the lowest populations on the refuge for a number of years.

C. Big Game

Deer and antelope numbers were similar to last year, with production up slightly. Trend counts in early September indicated a ratio of 48 Bucks : 100 Does : 85 Fawns, compared to 36 Bucks:: 100 Does : 68 Fawns a year ago.

D. Fur Animals, Predators, Rodents, and other Mammals

The muskrat population in Malheur Lake exploded during the past year, with house numbers increasing 5.19 times over last year (1,310 houses counted in 1971, compared to 6,802 houses counted this year). An unlimited take trapping program has been initiated to slow down the inevitable "die off." Blitzen Valley muskrat populations are thriving in ponds maintained year round, providing emergent vegetative control and numerous, aesthetically pleasing, waterfowl nesting sites.

No major change in numbers or densities of other species in this category.

Two formal coyote livestock depredation complaints were received during the year, considerably less than had been projected by area ranchers. Both involved calf kills, with one occurring in the Wright Field in February, and the other in the Lower Swamp portion of the Double-O unit. Wildlife Services trapper Vern Pifer apparently eliminated the source of the conflict with the removal of one female in the former case, and seven individuals in the latter case, as no further losses occurred. The losses, in both cases, were documented by refuge personnel.

The long-standing 1080 bait station control program that we have had on refuge lands was terminated during the 1971-72 control season, and we are now operating on strictly a complaint basis, with the principal methods of control ground and aerial gunning .... both of which have been quite successful thus far.

Emotions continue to run high in Southeastern Oregon over the prohibition on use of toxicants, but the success of aerial gunning ... particularly, when helicopters are used ... in removing problem animals or groups of animals has allayed many of the ranchers' immediate concerns. Most of the cost of these operations is now being borne by the complaining rancher, with technical assistance, program supervision, and gunners provided by the Division of Wildlife Services.

E. Hawks, Owls, Eagles, Crows, Ravens, Magpies

There were four active golden eagle nests producing five young, on and adjacent to the refuge this year. This compares to five active nests producing six young a year ago, and eight active nests producing seven young with production from one nest unknown in 1970.

Prairie falcons failed to nest above the Witzel Ranch on "P" Rim where they successfully raised two young a year ago. Peregrine falcons were observed only once in 1972, compared to four observations in 1971, and six in 1970.

A snowy owl observation in mid October was reported by Carl Davis, on his ranch about two miles east of Burns. Another snowy owl observation was reported by Sam and Larry Dunn in December, on their ranch in the Mud Lake area, adjacent to the refuge.

F. Other Birds

The third and fourth refuge records of the yellow-billed cuckoo were made on June 6. One of these birds flew into an office window, and died a short time later. The specimen is the first taken in Oregon in the last 25± years, and is now in the U.S. National Museum.

All other usual and unusual bird observations are on file at headquarters, biological files.

The Christmas Bird Count was conducted December 16. Fifty-three species composed of 5,561 individuals were observed by 14 participants. This compares to 55 species and 5,288 individuals observed a year ago.

G. Fish

In March of 1972, Krumbo Reservoir was checked with gill nets for survival and growth rate on 26,000 legal rainbows planted the previous October following drainage and treatment of the reservoir for roach.

Sample nets yielded 143 fish ranging from 6.9 - 12.0 inches, or an average of 10.0 inches in length. All fish were in excellent condition. The same afternoon an additional 35,000 fingerling rainbows from a state hatchery were released. Refuge visitors enjoyed many hours of fishing recreation on Krumbo this year and many were rewarded with rainbows up to 23 inches in length by October.

The Blitzen River and adjacent canals received approximately 6,500 legal-sized rainbow plants from two state fish hatcheries during the early part of the summer. Local fishermen and Steens Mountain

visitors enjoyed the fishing opportunities afforded them by these releases. Several limits of 10 - 12-inch rainbows were taken from the Blitzen River; all fish appeared to be in good condition.

H. Reptiles and Amphibians

Nothing accomplished with species in this category this year.

I. Disease

Nothing to report.

J. Other Losses

Transformers and transmission lines, both on and off the refuge continue taking their rather alarming toll of avian species. Transformer perching sites at stock-water wells accounted for numerous golden eagle, hawk, owl, raven and even great blue heron mortalities. Power lines fared equally well, taking greater sandhill cranes, trumpeter swans, geese, and ducks. Power transmission lines across Diamond Lane, Witzel Lane, and the north side of Buena Vista Pond were the greatest contributors to avian mortality in 1972.

Refuge personnel met with power company officials in an effort to make them aware of the magnitude of the problem - particularly, as it affects golden eagles, and encourage corrective measures. Both companies in this area have professed concern, and are experimenting with design changes, protective devices, etc.

We began more carefully documenting on-refuge power line losses, as a basis for determining where our problem areas are and how best to eliminate them. The removal of some power lines servicing stockwater wells on the refuge may be required.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development

Boundary fences were repaired at all stations and an additional $2\frac{1}{2}$ miles of boundary fence was rebuilt on the northeast side of Malheur Lake. Also $2\frac{1}{4}$ miles of boundary fence was constructed east of the P-Ranch. The NYC enrollees constructed $1\frac{1}{2}$ miles of interior fence.

Residence buildings at the substations were improved this year. Electric heat was installed in the Double-O house and an electric furnace was installed in the Buena Vista quarters. The Double-O quarters received a coat of paint inside and trim paint outside. Carpeting is also planned for the three substation residences.

The riprap job at Buena Vista Pond was probably the biggest work project undertaken this year. The job entailed riprapping the dividing dike at Buena Vista Pond to protect the dike against erosion from wave action. The project involved hauling 6,500 cubic yards of material.

The Dunn Dam road was resurfaced to provide year-round access to the dam.

The never ending maintenance and replacement of water control structures and the cleaning of ditches occupied much of the maintenance crew's time. Walkways to water control structures were constructed and repaired to allow easier access. A major ditch cleaning project near Krumbo Reservoir was completed this winter.

Stiles were constructed and positioned over the west fenceline from Diamond Lane to West Swamp field, to provide access points for sportsmen and bird watchers.

New white boundary posts with blue goose signs attached were placed along a large section of the refuge boundary. New hunting area access signs were made using fluorescent lettering to help guide hunters to the refuge campgrounds on the Malheur Lake Waterfowl Hunting Area. Facilities at the campgrounds were improved by installing new chemical toilets and cattle barriers around the toilets. Information bulletin boards and extra garbage cans were also added improvements.

The Frenchglen town dump and the Witzel family dump were cleaned up and burried. All garbage dump sites located on refuge lands will be phased out of operation by the end of 1973.

The Krumbo Public Fishing Area received a new look with the staining of the outhouses, picnic tables, and dam walkway.

Equipment repair this year consisted of the following: thirty 5,000-mile vehicle checkups, a major overhaul on the TD-9 end loader's hydraulic system, a new clutch plate and throw-out bearing for a pickup, wheel cylinder replacement for a $2\frac{1}{2}$-ton GMC truck, radiator replacement in our D-8 crawler, and several minor repairs on our AC loader, grader, crawler tractors, dragline, and pickups.

B. Plantings

1. Aquatic and Marsh Plants

None.

2. Trees and Shrubs

Ten hybrid poplars acquired last year from retired Refuge Manager Ben Hazeltine's nursery in the Flathead Valley, Montana, were planted in the headquarters area to screen the working area from the public use area. Additional plantings will be made as time permits.

3. Upland Herbaceous Plants

All spoil banks and other exposed areas resulting from field operations were seeded to a mixture of tall, intermediate and western wheatgrasses and sweet clover in an effort to speed up revegetation and minimize the chronic problem with Canada thistle invasion.

4. Cultivated Crops

Refuge personnel planted approximately 120 acres of barley in the West Buena Vista Pond Field, and a 10-acre experimental planting of wild millet obtained from the Sacramento Refuge in wet areas around the perimeter of the field. Barley production was spotty, but supported extensive use by sandhills, Canada geese and a variety of ducks well into the early winter period. Despite marginal water management conditions necessitated by the barley seeding, the millet demonstrated its adaptability and made excellent growth. The seed was quickly cleaned up by cranes and Canada geese, and cattle turned in after the waterfowl use period showed a definite preference for the plant. Further work with wild millet, preferably with seed from an area with more similar growing conditions, seems warranted.

Our cooperative farming program continues to be somewhat of a disappointment. We were still unable to find a farmer for the Double-O grain field. This has historically been a rather marginal farming area because of the water situation, and no one seems to be willing to risk the investment required. The field did produce a small amount of volunteer barley and rye, but the waterfowl and sandhill crane cereal grain crop requirements in this part of the refuge were left essentially unfulfilled.

We may be forced to farm this field by force account, as it is apparently the only potentially suitable grain farming area in that unit.

The cooperator in the Mud Lake Unit was unable to get his seed in the ground because of late moisture from Malheur Lake overflow water. He did manage to get a small part of his adjacent private grain land seeded, but use by wildlife .... primarily sandhills, Canada geese and antelope .... was of comparatively short duration.

The East Grain Camp farming program also produced disappointing results. Rye was interseeded in the residual vegetation on the north half of this field in an effort to avoid the wind erosion problem experienced in recent years when cultivation precedes seeding. This approach might have worked, as it did the previous year, had we experienced normal amounts of rainfall in May and June. As it was, the rye crop was extremely spotty and sparse. The cooperator decided not to harvest it, so a good deal of wildlife benefit was realized.

The alfalfa field in the south part of this field produced a light, but harvestable crop. Good use was made of the field by mule deer.

Grain production in the West Knox Unit was excellent, and that field supported extensive use by cranes, Canada geese and a host of duck species well into the winter.

At the end of the year, arrangements had been made with personnel of the new SCS office in Burns, and the County Extension office, for technical assistance in developing a more effective farming program. With cereal grain acreage in the Harney Basin steadily declining (from about 75,000 acres of barley and wheat in the early 1950's to less than 8,000 acres outside the refuge in 1972), refuge cereal grain production has become increasingly important to the maintenance requirements of migrant waterfowl, and perhaps vital to the Central California Valley sandhill crane flock that stages at Malheur each fall. We have the potential for an improved farming program. The need is for improved croplands management, better irrigation systems, and, in one or two units, the possible conversion of wild meadowlands now producing little wildlife benefits to grain production. The Sod House Unit is a prime candidate, as it has the soils and is located near a good water source.

C. Collections and Receipts

1. Seeds or Other Propagules

None.

2. Specimens

A total of 18 small mammals, 46 birds, six goose and gull eggs, 75 duck wings, two bridge lip suckers, and two sagebrush moths were collected or otherwise acquired during the year and donated to various individuals or institutions. Approximately 20 specimens remained in storage at the close of the period.

D. Control of Vegetation

A county weed control district was created during the year, and a county-wide noxious weed control plan subsequently adopted. The district proposes an eradication program on a watershed basis, and one of their first acts was to apply pressure on the Federal land managing agencies in the county to adopt aggressive control programs for all legally designated noxious weeds.

Because of the impracticality of controlling Canada thistle under our conditions, we decided to abandon the annual token effort to control this species in the Blitzen Valley, and focus on morning-glory and whitetop. The latter two are noxious weeds and their distribution on the refuge is quite limited. Thus, a small annual maintenance program is feasible.

District officials were not happy with our decision relative to Canada thistle, but became somewhat more sympathetic to our position following a field review of our Canada thistle infestation with an OSU weed specialist who agreed with our assessment of the problem.

We are considering chemical treatment of Canada thistle in only two situations: control of a small and what apparently is the only infestation in the Lawen area on the north side of Malheur Lake; and primarily roadside spraying adjacent to private lands at the lower end of the Blitzen Valley as a cooperative gesture to adjoining private land owner efforts to keep the plant out of their cultivated fields.

We cooperated with the OSU Extension Service in setting up a small experimental Canada thistle control plot in the Buena Vista Unit, using 2,4-D, Banvel, and a combination of these two chemicals.

E. Planned Burning

None. Plans were finalized for experimental burns for the control of emergent aquatic vegetation in the Buena Vista and Double-O units in February, 1973.

F. Fires

A ten-acre lightning caused fire in the Double-O Unit, and a warming fire set after dark by a waterfowl hunter temporarily lost on the public hunting area on the north side of Malheur Lake became our only reportable fires. The Double-O fire was quickly extinguished by refuge neighbors. The marsh fire burned out of control, but was confined to a one-half acre island by surrounding marsh waters.

IV. RESOURCE MANAGEMENT

A. Grazing

Livestock forage conditions were generally comparable to those experienced in 1971. The high water levels in Malheur Lake necessitated some curtailment of grazing use in that unit. Use elsewhere on the refuge was relatively unchanged.

Several features of our grazing program are becoming increasingly evident: (1) the historical level of use in many waterfowl production units is not conducive to the maintenance of high quality waterfowl nesting habitat; (2) winter feeding of rake-bunched and, particularly, stacked hay on the refuge makes it very difficult to properly manage unmowed vegetation for optimum wildlife benefits. The problem is compounded when carryover hay from previous years is fed during short water years. (3) Grazing permittees and most other people in the local community entertain the mistaken notion that refuge grazing privileges are attached to privately owned base properties, as they are with BLM and Forest Service privileges; and (4) our grazing rate of $2.00 per AUM is quite obviously significantly below the rate prevailing in this area. The implications are obvious, and need no elaboration here.

The grazing rate survey initiated in December, 1971 was nearing completion when the restrictions on rate increases were imposed early in the year. That survey will be completed in early 1973.

Summer grazing in the Coyote Buttes Field, Sod House Unit, was terminated prior to the grazing season, because we felt it conflicted with waterfowl production in that area. Livestock use in that field is now limited to fall grazing of standing vegetation.

A winter feeding operation involving the feeding of a permittee's personal hay on refuge lands was terminated in the Springer Field. This operation was not particularly conducive to managing vegetation for wildlife benefits.

B. Haying

About 220 tons of alfalfa hay harvested in the East Grain Camp Field, and 46 tons of native hay harvested in Tract 45 on Malheur Lake were sold on a tonnage basis. All other hay harvested on the refuge was sold on an AUM basis.

Mowing in the north end of the Double-O Unit began about July 17. Mowing in most of the other fields did not commence until much later in that month. While July 15 has traditionally been the mowing date on Malheur, data from an eight-year average hatching curve (1964-71) indicate that a substantial portion of our hatch occurs after that date (mallards - 4.2 percent; gadwall - 14.5 percent; cinnamon/blue-winged teal - 15.0 percent; and redhead - 13.4 percent). July 25 would be a much more compatible date, and will be adopted beginning in 1973. Along with this, of course, will have to come a later date for field drainage .... which has historically occurred about July 10, except in high water years when the quantity of water on the refuge simply prevents drainage until (in many cases) late July.

C. Fur Harvest

Aerial muskrat house surveys flown during the year revealed that the Malheur Lake population had increased dramatically over 1971. Only 62 houses were counted in January, 1971. By February, 1972, they had increased to 1,310 houses, and by November, to 7,480 .... for an estimated total population of 37,400 rats. A trapping program was initiated at the close of the period. A final report on the fur harvest will be included in next year's report.

Changes adopted this year over previous muskrat trapping program included:

1. No trapping quotas. It was our feeling that the State prohibition on trapping houses, the economic realities

of commercial trapping on Malheur Lake, and the constraints imposed on trapping methods would insure the preservation on a nucleus population.

2. Trapping units were established on the basis of rat house distribution, rather than on legal subdivisions. The previous approach resulted in a wide disparity in numbers of rats between the various trapping units.

3. Trappers were made responsible for staking or otherwise marking their own trapping units. The primary objective was to shift the work load from refuge personnel to the trappers. Maps of the trapping units were prepared and distributed to each trapper, with boundaries established on the basis of physical features or easily identified land marks wherever possible.

4. Division of furns to be based on gross sales, rather than division of pelts prior to sale. This eliminates most of the costly involvement of refuge personnel in the operational end of the trapping program.

During November and December a special beaver trapping permit was issued to one trapper to thin out problem beaver in the Upper Blitzen Valley. Seventeen beaver were taken from areas where problems were being experienced.

V. FIELD INVESTIGATION OR APPLIED RESEARCH

A. Progress Reports

1. Cronan, James Z. - "Observation Range as a Factor in Killdeer Nest Site Selection" - MLH #5. Dropped because of conflicts with military obligation.

2. Egeline, Steve C. - "Dispersion Pattern and Densities of Two Species of Rodent" - MLH #6. Objectives: Concerning Peromyscus maniculatus and Perognathus parvus in untreated sagebrush, killed sagebrush and crested wheatgrass habitats:
   A) Determine home range size for individuals of each species
   B) Determine densities of each species
   C) Determine dispersion patterns of each species.

   Field work completed; in process of writing up thesis.

3. Feldhammer, George - "Distribution and Abundance of Mammals on the Malheur National Wildlife Refuge." To commence in 1973; proposals and plans being submitted.

4. Furniss, Sean B. - "Population Dynamics and Migrational Movements of Mallards Banded in the Harney Basin, Harney County, Oregon." In progress, but no conclusive data to report to date.

5. Littlefield, Carroll D. - "The Ecology and Behavior of Greater Sandhill Cranes in Oregon and California." - MLH #3. Objectives:
   1. To delineate migration corridors of Greater Sandhill Cranes that nest in southeastern Oregon and northeastern California.
   2. To delineate Lesser and Greater Sandhill Crane wintering distribution and determination of their numbers in California and Western Arizona.
   3. To determine factors limiting the sandhill crane nesting population at Malheur National Wildlife Refuge, Harney County, Oregon.

   Field work completed, academic studies and writing of thesis being completed at the University of Arizona, to satisfy the PhD requirements. Progress reports available upon request to Malheur NW Refuge.

6. Newman, Thomas M. - "Archeological Reconnaissance." Objective: Inventory of refuge archeological resources as a basis for their preservation, reconstruction of prehistoric habitats, environments, and an understanding of man's ecologic relationship to these changing environments for subsequent on-site interpretations.
   Field work completed during the summer months; final report in process of completion.

7. Wittenberger, James F. - "An Ecological Study of the Bobolink Population at Malheur National Wildlife Refuge." MLH #8. Objectives:
   1. Census, band, and color band the bobolink population on the refuge.
   2. Obtain quantitative data on dates of nesting cycle territory size, frequency of polygyny, and reproductive success relative to vegetational characteristics of the habitat.
   3. Measure directional preferences of emigratory bobolinks, when they depart the area in August - September.

The first of three field seasons-investigations completed this year. Most significant was a total of 143 adult males counted in the vicinity of the P-Ranch Station during the period 16 June - 23 June. Previous estimates were of 40 to 50 males in this area. Two field seasons for investigation and research remain in this PhD project.

8. Snively, John - "Investigation and determination if Leucocytozoon infections occur in Canada geese raised at Malheur National Wildlife Refuge, Harney County, Oregon." Two field seasons of research completed, which were taking blood samples from locally produced geese captured for banding each June. No infestations of Leucocytozoon simondi have been found within the flock. Thesis being written and anticipated to be completed this school year.

9. McLaury, Eldon L. - "Investigation of Pond Water Levels During the 1972 Waterfowl Brooding Season." Tinker Study MLH #2. Objectives: Collect, record, and evaluate water level data from pre-selected permanent and semi-permanent ponds in the Blitzen Valley portion of the Malheur National Wildlife Refuge during the waterfowl brooding season - June 1 - September 1. Field work completed and report written, with recommendations made relative to pond water level management on the refuge.

10. Breeding Bird Census. Refuge Personnel. The 40-acre square study plot in a juniper-sage upland type was studied again this year to: a) determine nesting densities of territorial and non-territorial species of birds within a selected habitat, b) establish base lines on bird populations for future comparisons, c) study the long-term changes in bird populations as related to such variables as land-use practices, successional changes, weather extremes, and d) determine habitat preferences of nesting species. Census results again indicated rock wrens were the most common breeding bird, followed by chipping sparrow, and lark sparrow.

11. Breeding Bird Surveys. Refuge Personnel. Six, 25-mile Breeding Bird Surveys were completed during the year. The surveys begin one-half hour before sunrise, and continue until completed, sometime prior to 10:00 a.m. There are 50 stops along the route, with all birds seen or heard at each stop recorded. 600 RBU's for these -- and fun too.

12. "Effects of an experimental management scheme on production and nesting ecology of ducks at Malheur National Wildlife Refuge." Objectives:
    1. Determine the effects of restricted mowing and no winter grazing on the production of ducklings.
    2. Determine the effects of restricted mowing and no winter grazing on the security and attractiveness of nesting cover.
    3. Determine the relationship of interspersion of nesting cover types, open water areas, and water areas supporting stands of emergent vegetation to duck production.
    4. Determine the amount and quality of forage produced and relate these to forage needs.

    Study to be completed by graduate student from Oregon State University, with required modifications in land use to begin during the summer of 1973.

B. Waterfowl Banding

The refuge waterfowl banding program got underway in July with the annual goose drive at Knox Pond. A total of 83 Canada geese were banded, 73 of which were birds of the year. Banding operations on Beulah Reservoir, under the direction of the Game Commission, netted 23 Canada geese and 1 lesser snow goose for a total of 106 geese banded for both drives.

Pre-season duck banding was initiated in mid-August. By early October 1,213 ducks had been banded. These, in conjunction with Umatilla National Wildlife Refuge's banding program, fulfilled the Continental banding quotas set for Eastern Oregon.

Inclusive with the birds banded were 130 juvenile mallards, 13 of which received special reward bands to aid in determining band return rates for the United States. Mallards comprised 46 percent and pintails 44 percent of the ducks banded.

There were 12 Canada geese and 13 mallard recaptures during banding operations in 1972. One mallard recapture had been raised on a game farm by the Pennsylvania Game Commission, banded and released on July 6, 1971.

C. Banding of Other Birds

The use of mist nets around refuge headquarters and substations netted 158 non-waterfowl species. These were banded except for 7 recaptured songbirds which had been banded the previous year. Included in the non-waterfowl species banded were 1 mourning dove, 1 sparrow hawk, and 12 common snipe.

VI. PUBLIC RELATIONS

A. Recreational Uses

1. Public Use Measuring System

Malheur was selected as one of several refuges to participate in testing a new system of public use measurement.

At the beginning of our public use season in March, a visitor interview station was established at the main exit point from the refuge, on State Highway 205. Interview periods were stratified and ran approximately four hours on scheduled days. Traffic counters were positioned to tally the traffic volume. Extensive questionnaires were filled out for each car of refuge visitors to gain data on their activities. The station was operated through mid October, and was manned largely by College Work Study students.

This information is now being analyzed and will provide us with reliable information on the nature of refuge visitation.

2. Recreational Use

Refuge visitation was approximately 37,455 people in 1972, as compared to 28,159 in 1971 - a 33 percent increase. Headquarters visitation (museum, display pond, antelope pen, and fire tower) and wildlife observation on refuge lands account for the major portion of visitation activities.

An estimated 2,100 sportsmen hunted waterfowl, upland game, and deer at Malheur this year, about the same as in 1971.

B. Refuge Visitors

A complete record of refuge visitors is on file.

C. Refuge Participation

1. Mazzoni

Attended regular meetings of Burns Lions Club and Chamber of Commerce, and periodically attended meetings of the Harney County Planning Commission, Weed Control District, Soil and Moisture Conservation District, Historical Society, Burns Elks Club, Harney-Malheur-Grant Tri-County Rural Development Committee, Southeast Oregon Council of Governments, and one Izaak Walton Club meeting. Attended various interagency meetings with the Oregon State Game Commission and State Land Board, the Bureau of Land Management and Ochoco and Malheur National Forests regarding hunting and fishing programs, long range plans, and other matters of mutual interest. Attended USFS public hearing relative to wilderness studies in the Silver Creek and Silvies River drainages on March 6 and Section 5 Agricultural Experimental Field Station Beef Cattle Field Day on March 28. Served as field judge at regional high school track meet on April 29. Presented statement at Burns-Hines public mosquito control hearing on May 1. Slide presentation on refuge planning system and objective setting to Tri-County RDC on July 10. Refuge tours and talks to three school groups totaling about 100 pupils. Served as master of ceremonies at P-Ranch Centennial celebration held June 17 in conjunction with Annual Harney County Grass Tour. Hosted visit of Secretary of the Interior staff personnel, Dick Hite and Craig Swanson, on June 28. Presented seminar on refuge planning system and objective setting process at Malheur Environmental Field Station on July 19. Assisted with Environmental Education Workshop for teachers on September 23 and 24. Testified at trial concerning cattle rustling charge and involving refuge lands in December.

2. McLaury

A busy year, working with two filming groups on refuge documentaries, advising and working with numerous photographers, professional students, and refuge management study programs, showing films and conducting tours for historical groups, water resources board, and presenting programs to environmental education groups such as the Order of the Antelope, Environmental Field Station, and 4-H Camp. Also included advisory capacity to USFS in sandhill crane study, while being a regular contributor to American Birds notes, completing breeding bird surveys, working with breeding bird

census plots while completing general duties of waterfowl and shorebird censuses, goose and duck pair counts and production estimates, new NR reporting forms, colonial bird nest estimates and success, dove coo counts, pheasant crow counts, aquatic surveys, waterfowl banding, hunting program, muskrat harvest program, and other general and incidental duties associated with the program.

3. Toltzmann

Conducted 6 tours for 192 people, including the refuge and Harney County segment of the USDI-sponsored African Student Program Tour, and presented programs for 3 high school and college biology-ecology classes to a total of 110 students.

4. Anderson

Presented illustrated programs and lectures to 9 groups, totaling 310 people, and provided 12 tours and walks for 222 people.

5. Furniss

Presented slide programs or movies to approximately 454 people in 13 groups, and gave 7 tours to a total of 152 students and birding enthusiasts.

6. Sjostrom

Provided orientation talk and film at the Malheur Environmental Field Station for 50 second graders and their teachers from Burns.

7. College Work Study Student Kris Gniewoscz presented 2 programs to 44 people and accompanied an OMSI tour group of 45 students on a tour of the refuge.

D. Hunting

1. Waterfowl

This was one of the poorest years for waterfowl hunters at Malheur. The waterfowl harvest was believed to be 2,638 birds. It was estimated that about 1.83 ducks/hunter were bagged. Goose hunting on Malheur Lake was fair. Although the lake contained about 45,000 surface acres of water during the hunting season, the submergent vegetation crop was poor and the

birds moved out of the area shortly after their arrival. The season ran from October 14 to January 14.

2. Deer

The upper Blitzen Valley archery hunt was held three weeks earlier this year (August 26 - September 4). In addition, the hunting period lasted 10 days as compared to 3 days during the 1971 archery hunt. The hunt was opened earlier and lasted longer in an effort to more evenly distribute the hunting pressure over a longer period of time. The early hunt coincided with the Hart Mountain archery hunt and thus released some of the hunting pressure on both areas.

Approximately 445 hunters harvested 18 deer, with a success of 4.0 percent. The hunters averaged 4.8 hours apiece in the field. This compares with the 1971 figures of 250 hunters bagging 15 deer, for a success of 6.0 percent.

3. Upland Game Birds

Pheasant hunting was again authorized in the Malheur Lake Waterfowl Hunting Area, conforming to the regular Oregon season. Hunter success was the lowest in the five years that the area has been open. This has been the second consecutive season of poor pheasant hunting on the area, probably due to the high water levels within the marsh which restricted pheasant habitat.

A special 23-day season, November 4 through 26, was held in the Upper Blitzen Valley. Hunter effort was strong the first week with 62 percent of the total number of hunters on the area. The season take was poor, with 259 hunters bagging 84 pheasants and crippling 15. Success on pheasants was almost a bird a man opening week, dropping to almost zero during the latter part of the season, for an average of .32 birds/man. The pheasant bag is down from 133 birds taken in 1971. Quail hunting was negligible.

E. Violations

The Oregon State Police made 8 cases and issued 3 warnings during the hunting season on or adjacent to the refuge. Citations issued by refuge personnel were forwarded to the Oregon State Police for processing.

Following is a summary of 1972 hunting violations:

Warnings: Waterfowl without wings (2),
No Hunters Safety Card (1).

Arrests: Taking canvasbacks (3),
No heads or wings on birds (5),
Taking whistling swans (1).

An additional 4 warnings were issued by refuge personnel for assorted minor offenses.

F. SAFETY

1. Meetings

Four general and eight committee meetings were held this year. SAFETY inspections and fire drills were held quarterly.

2. Accidents

Maintenanceman Jack Dalton suffered a heart attack on the job, which resulted in disability retirement. A determination as to whether it was job related was pending at the close of the period.

Two minor accidents occurred, one of which required medical attention.

3. Corrective Measures Taken

Walkways to water control structures were repaired and new ones constructed. Tree limbs were trimmed into Witzel Patrol Station and other areas were cleaned up to prevent scratching paint on automobiles. Dead limbs were removed from trees at all stations to prevent accidents. Reflectors were installed on some of our bridges and culverts. Fire extinguishers were checked and re-charged in all quarters and buildings.

4. Record

As of December 31, 1972, we have had 704 no-lost-time accident-free days (assuming Mr. Dalton's accident was not job related and not a lost time accident).

VII. OTHER ITEMS

A. Items of Interest

On the weekends of September 29-30, October 1 and October 6-8, the refuge cooperated with the Forest Service and the Bureau of Land Management in conducting an Environmental Education course at the Malheur Environmental Field Station. Three credits were offered by Eastern Oregon College at La Grande to those teachers successfully completing the course. One of the main objectives was to assist teachers in developing an activity oriented curriculum using various parts of the environment as a classroom. The refuge served as the outdoor classroom and personnel provided segments of the program. Refuge Manager Mazzoni gave a seminar on wetlands and Biologist McLaury coordinated studies in environmental investigation. This is the first year credit has been offered and teachers involved were very enthusiastic about what they had learned.

In cooperation with the Oregon State University Extension Service we participated in the NYC Program utilizing 10 students for the summer period.

Four College Work Study students were employed during the summer, two were used principally as public use checkers and in conducting inventories.

An interpretive plan was completed at the end of the year by contract with ExhibiGraphics, Inc. of Salt Lake City, Utah. This plan should provide a firm basis for developing an effective interpretive program at Malheur.

County sanitary land fill sites have now been developed in all refuge communities, and all refuge dump sites will be phased out of operation by mid 1973. The extensive Frenchglen town dump site located on refuge land adjacent to State Highway 205 was cleaned up and buried in November. The Witzel family dump site adjacent to the fishing access road to Krumbo Reservoir was also buried, and the Witzels instructed to dump their garbage in the county dump off the refuge.

An analysis of the refuge motor vehicle operations resulted in a joint GSA/refuge recommendation that the refuge vehicle inventory be turned over to the Boise GSA Motor Pool for administration. Estimated savings total $17,000, and involve the relinquishment of the refuge automotive mechanic position. A GSA maintenance shop would be established in Burns, and would service both the BLM and the refuge. That proposal was pending approval by GSA in Washington, D.C. at the end of the year.

The BBC film crew, Ron and Rose Eastman, and producer Barry Paine completed their filming on the refuge of their projected TV Special to be viewed some time in 1973.

James Hammond's film on the refuge and Harney County has been completed and edited and is now being shown to Audubon Society groups.

On the scientific side of movie making, Dr. Robert W. Storer of the University of Michigan spent several days on the refuge in connection with his work on grebes, filming our Westerns.

A reconnaissance of refuge archeologic resources was completed in the Blitzen Valley Unit by a College Work Study team under the direction of Archeologist Dr. Tom Newman of Portland State University. This was the initial phase in a three-year study to develop an inventory of all refuge archeologic resources. Refuge costs were limited to paying 20 percent of the two graduate archeology students' salaries.

Maintenanceman Ken Hite and his wife Arlene put on a Hunter Safety course for youngsters 10-13 in February and March. In cooperation with the Oregon Game Commission they showed four movies on each of four Saturdays and held a rifle range on the last Saturday. Fifteen youngsters in the Frenchglen and surrounding communities participated.

The P-Ranch celebrated its first 100 years as a ranch at the P-Ranch Centennial held in June. Giles French, noted Pete French author, was keynote speaker and Refuge Manager Mazzoni MC'd the program.

Our antelope herd in the display pasture was increased by two kids, bringing the total to eight.

One hundred thirty-one "Bills for Collection" totalling $191,497.86, were issued for the period January 1 through December 31, 1972.

On December 5, Refuge Manager Mazzoni presented the Harney County Court with a check in the amount of $75,510.65 as their share of refuge receipts.

B. Training

Foreman Cagle conducted a Basic First Aid course for all employees except Mrs. Gail on February 7 and 8. He attended a U.S. Civil Service Commission Basic Management Techniques I course in Idaho Falls, Idaho from November 13 to 17.

Biologist McLaury attended a U.S. C.S.C. Basic Management Techniques II course in Boise, Idaho from November 27 to December 1.

Clerk-Stenographer Gail attended a U.S. C.S.C. Better Office Skills course on December 5 through 7 in Spokane, Washington.

Refuge Manager Mazzoni attended an Environmental Workshop for Resource People sponsored by the U.S. Forest Service at Sports Acres, Oregon during the period March 14 through 17.

C. Credits

Joseph P. Mazzoni.....	Sections I. A and B 1; II. D (partial) and J (partial; III. A through F; IV. A, B and C; VI. A and C (partial); VII. A (partial) and B and editing of entire report.
Eldon L. McLaury.....	I. B 2; II. A through C, D (partial), E, F, H, I and J (partial); V. A; and VI. C (partial.
Noel L. Cagle.....	VI. F and NRs (partial).
Ivan J. Carey.....	VII. A (partial, NRs (partial) and typing captions on photos.
Richard R. Sjostrom.....	II. G; IV. C; V. B and C; VI. D and E.
Irma G. Gail.....	VI. B and C (partial); VII. A (partial) and typing.

All refuge personnel have contributed throughout the year to the accumulation of information upon which this report is based.

SIGNATURE PAGE

Submitted by:

(Signature)
Joseph P. Mazzoni

Refuge Manager
(Title)

Date: March 7, 1973

Approved: Regional Office:

Date: Regional Refuge Supervisor

Edward J. Smith
(Signature)

3/27/73
(Title)

Foreman Cagle searching for one of the Steens Mountain soil moisture guages, during annual snow survey.

Toltzmann

BBC photographer with retired Manager John Scharff on snow survey. Filming of this feature on John and the Malheur Refuge extended into late summer.

Toltzmann

Removing ducks from the cannon net in the stillness of a foggy September morning.

McLaury

Award bands were placed on thirteen mallards in the process of meeting post season banding quotas.

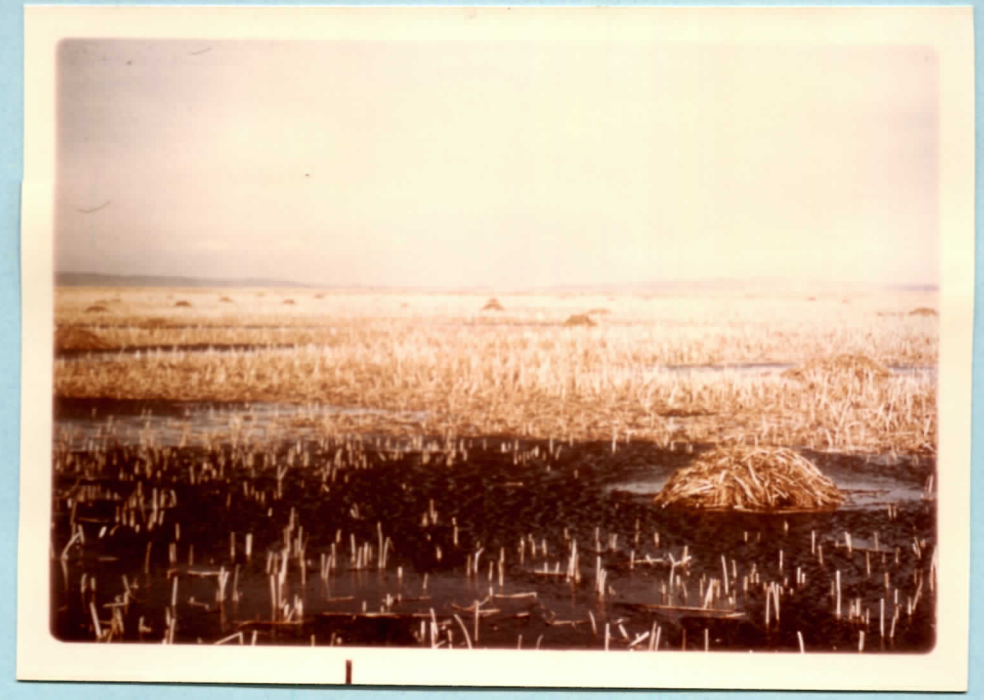
McLaury

Albino cormorant produced on Malheur Lake.

McLaury

P-Ranch Centennial celebration attracted over 600 people in June.

McLaury



Muskrats increased dramatically during the year, with an estimated 37,000 on Malheur Lake by fall.

McLaury

Assistant Manager Toltzmann, right, discussing the refuge with AID trainees from various African Nations.

Gniewosz

Environmental education workshop attracted 12 teachers in September.

McLaury

An initial inventory of historic and archeologic sites and buildings was completed during the year. Above is the original house at the Sod House Ranch. Built sometime in the 1880's.

Anderson

This sod roofed stone cold storage building at the Sod House Ranch has the French-Glenn cattle Companies brand and the year 1900 carved in stone above the door.

Anderson

The old beef gallows at the Sod House Ranch was badly damaged by wind in March. The pieces were salvaged for later restoration.

Anderson

Grave sites on the refuge have been fenced from livestock, and their often vague history documented for future interpretation.

Anderson

The Brenton Cagin corrals are the best preserved willow corrals left in Harney County. They will eventually be part of the Brenton Cabin interpretive site.
Anderson

Desecration of the Buena Vista petroglyphs began long before refuge lands in the Blitzen Valley were acquired...but the thoughtless destruction continues. Interpretive facilities that offer protection are needed. Anderson

Refuge Manager, Malheur Refuge
Burns, Oregon

March 27, 1973

Regional Refuge Supervisor
Portland, Oregon

1972 Annual Narrative Report -- Malheur Refuge

Subject report has been reviewed and is approved.

Edward J. Smith

Edward J. Smith

RGilmore:ce